

WHAT IS CLAIMED IS:

- 1 1. An optical device comprising:
2 a first I/O waveguide carrying an optical signal with a plurality of
3 wavelengths;
4 a second I/O waveguide carrying a first wavelength of the plurality of
5 wavelengths;
6 a third I/O waveguide carrying a second wavelength of the plurality of
7 wavelengths; and
8 a single-side-pass filter optically coupled to the first I/O waveguide,
9 wherein the first single-side-pass filter reflects a first wavelength between the first I/O
10 waveguide and the second I/O waveguide and the first single-side-pass filter passes a
11 second wavelength between the first I/O waveguide and the third I/O waveguide.
- 1 2. The optical device of claim 1 further comprising:
2 a first collimator assembly comprising a GRIN lens optically coupled to the
3 first single-side-pass filter, a first waveguide optically coupled to the first I/O waveguide,
4 and a second waveguide optically coupled to the second I/O waveguide, wherein the first
5 single-side-pass filter reflects the first wavelength between the first I/O waveguide and the
6 second I/O waveguide through the second waveguide of the first collimator assembly.
- 1 3. The optical device of claim 2 further comprising:
2 a second collimator assembly comprising a GRIN lens optically coupled to
3 the first single-side-pass filter and a first waveguide, wherein the first single-side-pass
4 filter passes the second wavelength between the first I/O waveguide and the third I/O
5 waveguide through the first waveguide of the second collimator assembly.
- 1 4. The optical device of claim 3 further comprising:
2 a third collimator assembly comprising a GRIN lens, a first waveguide
3 optically coupled to the second waveguide of the first collimator assembly; and a second
4 waveguide;
5 a fourth collimator assembly comprising a GRIN lens and a first waveguide;
6 and

1 10. The optical device of claim 5 wherein a specified wavelength of the
2 first single-side-pass filter is about 1550.02 nanometers, a specified wavelength of the
3 second single-side-pass filter is about 1524.38 nanometers, and a specified wavelength of
4 the third single side-pass filter is about 1575.62 nanometers.

1 11. An optical system including an optical device as described in
2 claim 1.

1 12. The optical device of claim 1 further comprising:
2 a fourth I/O waveguide carrying a third wavelength of the plurality of
3 wavelengths; and
4 a second single-side-pass filter, wherein the second single-side-pass filter
5 reflects the third wavelength between the first I/O waveguide and the fourth I/O waveguide
6 and passes the second wavelength between the first I/O waveguide and the third I/O
7 waveguide.

1 13. The optical device of claim 9 further comprising:
2 a fifth I/O waveguide carrying a fourth wavelength of the plurality of
3 wavelengths; and
4 a second single-side-pass filter, wherein the second single-side-pass filter
5 reflects the fourth wavelength between the first I/O waveguide and the fifth I/O waveguide
6 and passes the second wavelength between the first I/O waveguide and the third I/O
7 waveguide.

1 14. The optical device of claim 13 wherein the first, second and third
2 single-side-pass filters are separated by about 25.6 nanometers.

1 15. The optical device of claim 1 further comprising:
2 a first GRIN lens optically coupled between first I/O waveguide and the
3 first single-side-pass filter; and
4 a second GRIN lens optically coupled between the third I/O waveguide and
5 the first single-side-pass filter.

1 16. The optical device of claim 15 further comprising a third GRIN lens
2 optically coupled between the second I/O waveguide and the first single-side-pass filter.

1 17. The optical device of claim 1 further comprising a spherical
2 dielectric lens optically coupled between the second I/O waveguide and the first single-
3 side-pass filter.

1 18. The optical device of claim 1 wherein the first single-side-pass filter
2 is curved.

1 19. An optical device comprising:
2 first and second collimating lenses, each of the collimating lenses
3 comprising:
4 a dual capillary GRIN lens with first and second waveguide terminals;
5 an optical filter coupled to the dual capillary GRIN lens;
6 a single capillary GRIN lens coupled to the optical filter; and
7 wherein the first waveguide terminal of the first collimating lens is optically
8 coupled to the first waveguide terminal of the second collimating lens.

1 20. The optical device of claim 14 further comprising:
2 a third collimating lens comprising:
3 a dual capillary GRIN lens with first and second waveguide terminals;
4 an optical filter coupled to the dual capillary GRIN lens;
5 a single capillary GRIN lens coupled to the optical filter; and
6 wherein the first waveguide terminal of the third collimating lens is
7 optically coupled to the single capillary GRIN lens of the first collimating lens.